

Examining the need for a metaverse-based blended learning module in college English: insights from Southwest China

Yuliang Jiao^{1,2}, Rafiza Abdul Razak², Dorothy DeWitt²

¹School of Foreign Languages, Chongqing Three Gorges University, Chongqing, China

²Department of Curriculum and Instructional Technology, Faculty of Education, University of Malaya, Kuala Lumpur, Malaysia

Article Info

Article history:

Received Jul 18, 2024

Revised Dec 20, 2024

Accepted Mar 19, 2025

Keywords:

Blended learning

English as a foreign language

Immersive technologies

Metaverse

Student perceptions

ABSTRACT

Although English is an important language for globalization and innovation, Chinese students lack the proficiency in the language, which might be attributed to the lack of engagement. Further, as immersive technologies can enhance learning, this study investigates the perceptions and readiness of integrating metaverse-based blended learning (MBBL) modules in college English curricula. A survey among 380 undergraduate students in southwestern China using a questionnaire was conducted to determine their learning preferences and technological readiness. Findings indicate that students needed more engaging and interactive activities, preferring collaborative and simulative learning environments. Despite limited familiarity with metaverse technologies, students demonstrated technological readiness. Hence, the results suggest that a MBBL to enhance English as a foreign language (EFL) education could be implemented. This study provides empirical evidence to inform the design of a metaverse-based technologies in EFL instruction for innovation in tertiary language pedagogy. Future studies could design such a module for implementation and evaluation.

This is an open access article under the [CC BY-SA](#) license.



Corresponding Author:

Rafiza Abdul Razak

Department of Curriculum and Instructional Technology, Faculty of Education

University of Malaya

Wilayah Persekutuan Kuala Lumpur, Kuala Lumpur, Malaysia

Email: rafiza@um.edu.my

1. INTRODUCTION

English proficiency is essential for developing global competencies and fostering innovation [1]. However, English proficiency scores among Chinese students are lower than their regional peers, as China ranked 33rd out of 40 Asian countries [2], and was categorized as low proficiency globally [3]. Further, there are challenges in English as a foreign language (EFL) education in Chinese universities. Teacher-centered approaches are predominant in EFL instruction, which hinders student engagement and reduce motivation [4], [5]. The overemphasis on knowledge transfer rather than communicative competence has also resulted in insufficient opportunities for application of practical language and students' lack of ability in using English effectively in real-world contexts [6]. Hence, there is an urgent need for educational reforms that prioritize skills' development and practical language.

Blended learning combines traditional classroom instruction with online learning and allows students to engage in a variety of online learning activities while attending in-person classes [7], [8]. It is increasingly prevalent in higher education and is one of the top ten educational trends of the 21st century [9]. Blended learning has been widely adopted in various educational situations due to the potential benefits and flexibility [8], [10], [11] and has shown promise in overcoming the limitations of traditional classroom

settings, leading to positive outcomes in language skills and academic performance [10], [12]–[14]. Although there are advantages of blended learning, there are several challenges. The pedagogical challenge in ensuring meaningful interaction and communication within the online learning component, remains a significant hurdle [15], [16].

The rapid advancement of technology is transforming traditional pedagogies, with the metaverse emerging as a revolutionary tool in education [17], [18]. Metaverse technology offers immersive, interactive, and personalized learning environments that enhance student engagement and knowledge acquisition [19], [20]. This innovative platform presents significant potential for improving English proficiency by addressing current limitations in educational methods [18], [21], [22]. By creating an immersive, interactive, and personalized learning environment, it could increase student engagement and knowledge acquisition.

Metaverse platforms provide a shared virtual space for user interaction and collaboration, creating opportunities for experiential learning. Integrating metaverse technology into blended learning can address existing limitations by offering dynamic social interaction and immersive experiences [23]. This combination has the potential to create a transformative educational experience that surpasses traditional classrooms. The metaverse's immersive features open new possibilities for blended learning, going beyond traditional online education [18]. Metaverse-based blended English learning can enhance the depth and breadth of learning activities, fostering stronger teaching-learning relationships [24]. Additionally, it offers a more authentic language learning environment, potentially improving language acquisition and retention [25].

Although the metaverse presents significant opportunities, there is a notable gap in the application of metaverse technology within EFL education, particularly in its integration with blended learning models in college English courses [6], [25]. This study, therefore, aims to examine the need for a metaverse-based blended learning (MBBL) module in college English, by investigating students' perceptions of the current instructional methods, exploring their learning preferences, and assessing their readiness to adopt metaverse-enhanced learning. This study would offer critical insights into the necessity and potential impact of this innovative technology and the educational strategy for the design and implementation of an effective and engaging EFL education in universities.

2. METHOD

2.1. Sampling

In Southwest China, there are 146 universities with approximately 1.2 million undergraduate students enrolled. A stratified sampling approach was employed across five provinces to identify the participants. This methodological strategy facilitates in-depth investigation of the need for a MBBL module for college English as the sample was strategically selected [26]. To ensure diverse perspectives, maximum variation sampling (MVS) was utilized as the six universities across five provinces, had varying characteristics [27]. As Sichuan Province has a significantly higher number of universities compared to other provinces, two institutions were selected for the study, while one institution was selected from each of the remaining provinces. To maximize sample diversity and enhance data richness, participants were recruited from the first through fourth semesters at each university. Table 1 details the sample distribution.

Table 1. Undergraduates in universities in Southwest China

Region	Number of universities	Number of current students
Sichuan	53	1,041,510
Chongqing	28	506,480
Yunnan	32	515,446
Guizhou	29	404,847
Xizang	4	28,521
Total	146	2,496,804

2.2. Instruments

Data collection was conducted through a comprehensive questionnaire consisting of 39 items. The instrument was structured into four sections: demographic information, perceptions of current college English courses, learning style preferences, and readiness for engaging with a metaverse-based module. This questionnaire was adapted from the perceptual learning style preference questionnaire (PLSPQ) [28] and a readiness assessment tool for blended classroom environments [29]. Participants' responses were measured using a five-point Likert scale to ensure standardized quantitative data collection. To ensure content validity, two experts in curriculum and instruction reviewed the questionnaire and certified translators ensured the Chinese translation maintained linguistic equivalence. A pilot study involving 32 undergraduate students was

conducted to assess the questionnaire's reliability, resulting in a high Cronbach alpha coefficient of 0.93 which indicated robust internal consistency.

2.3. Data collection and analysis

The final questionnaire was distributed via the online platform *Wenjuanxing* (<https://www.wjx.cn/>) and participants accessed the questionnaire through either a QR code or a hyperlink. A total of 380 undergraduates participated in the study, ensuring a sufficient representation of the target population. Quantitative data analysis was conducted using IBM SPSS Statistics software (Version 26) and descriptive statistics were computed to summarize participants' demographic characteristics and their responses to individual questionnaire items.

3. RESULTS AND DISCUSSION

This section presents the research findings in four parts, corresponding to the structure of the questionnaire: demographic information, perceptions of current college English courses, learning style preferences, and readiness for the MBL module.

3.1. Demographic profile of respondents

A total of 352 deemed valid responses was obtained from the 380 questionnaires distributed, with an effective response rate of 92.6%. The sample composition revealed a slightly higher proportion of male participants (51.1%) compared to female participants (48.9%). The distribution across academic semesters was as follows: semester 1 (29.5%), semester 2 (25.9%), semester 3 (21.9%), and semester 4 (22.7%). science and engineering majors constituted the largest group of academic discipline (38.6%), followed by humanities and social sciences (22.4%), arts (16.2%), and other fields of study (22.7%).

3.2. English proficiency

An analysis of the respondents' English scores in the college entrance examination revealed diverse proficiency levels. The majority of students (55.6%) had a moderate level of performance (scores ranging from 90 to 110 out of a possible 150 points). Notably, 22.7% of the sample scored below the passing threshold of 90 points while only a minority (9.9%) had a high level of achievement (scores above 121 points). Figure 1 provides a visual representation of this distribution.

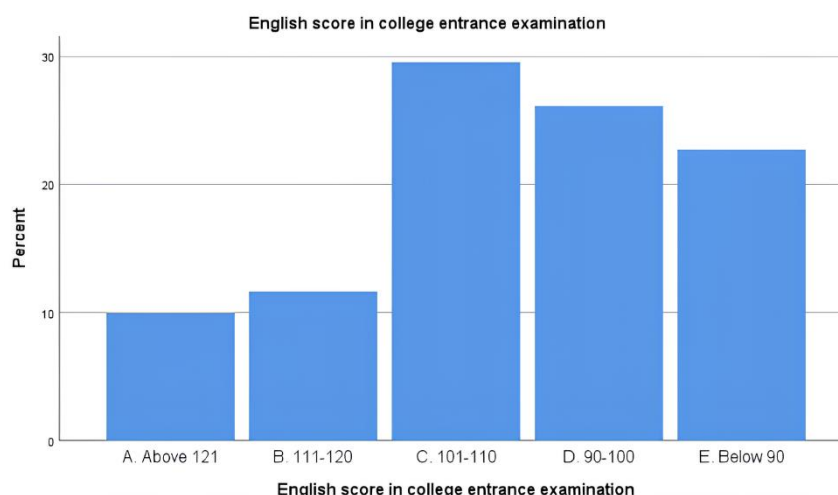


Figure 1. Distribution of students' college entrance exam English scores

These results underscore the moderate EFL competence of Chinese students, highlighting the need for improved English proficiency and enhanced language instruction. These results align with previous research and statistics from the IELTS test [2] and the white paper of EPI [3], which similarly highlight the moderate EFL competence of Chinese students. The significant proportion of moderate to low scores underscores the urgent need for improved English language instruction at the college level, as many undergraduates struggle to achieve higher proficiency levels. This emphasizes the need for more effective and targeted language education.

3.3. Perspectives of undergraduates on the college English course

This section analyzes undergraduates' views on the current college English course based on responses to a 5-point Likert scale questionnaire. Table 2 presents the mean scores, standard deviations, and response distributions for each item. Students' perceptions of the course's usefulness and importance indicated a majority of students (65.4%) found the course helpful ($M=3.71$, $SD=0.979$), and 67.6% considered it important ($M=3.82$, $SD=1.036$). These findings suggest that students generally recognize the value of the college English course in their academic journey.

The trends in students' confidence and interest levels indicated only 11.1% of students reported increased confidence in English communication ($M=2.41$, $SD=0.995$), and merely 13.1% found the course interesting ($M=2.43$, $SD=0.982$). These results highlight a critical need for more engaging and confidence-building pedagogical approaches.

Students' comprehension of the learning objectives revealed that a majority of respondents (59.1%) reported clarity regarding course objectives ($M=3.60$, $SD=0.976$). However, the instructional methods appeared less effective as a predominance of lecture-based instruction is indicated, with 67.6% of students confirming this approach ($M=3.77$, $SD=0.854$). Despite this, only 6.8% of students believed that these methods enhanced their English skills ($M=2.29$, $SD=0.907$). This disparity between understanding course objectives and the perceived effectiveness of teaching methods suggests a need for more diverse and interactive teaching strategies. While students generally understand what they are expected to learn, the current instructional approach may not be effectively facilitating this learning.

The learning activities within the college English course indicated that only 8.2% of students reported close teacher-student interaction ($M=2.26$, $SD=0.974$) and a mere 8% of students found the learning activities contributive to their learning ($M=2.34$, $SD=0.942$). The low scores on both teacher-student interaction and the perceived value of learning activities suggest that current teaching practices may be too passive or disconnected from students' learning needs. These findings underscore the necessity for more interactive and meaningful learning experiences.

Table 2. Statistics of undergraduates' perception toward college English course

No.	Items	SD	D	N	A	SA	M	SD
1.	The college English course is helpful to me.	2.8% (10)	8.80% (31)	23% (81)	45.2% (159)	20.2% (71)	3.71	0.979
2.	The college English course is important.	3.4% (12)	7.40% (26)	21.6% (76)	39.2% (138)	28.4% (100)	3.82	1.036
3.	The college English course boosts my English communication confidence.	18.8% (66)	36.1% (127)	34.1% (120)	7.40% (26)	3.70% (13)	2.41	0.995
4.	The college English course is interesting.	18.2% (64)	35.8% (126)	33% (116)	10.8% (38)	2.30% (8)	2.43	0.982
5.	I am clear about the learning objectives of the college English course.	3.70% (13)	8.00% (28)	29.3% (103)	42.6% (150)	16.5% (58)	3.6	0.976
6.	Lecturing is the most used teaching method.	2.00% (7)	4.00% (14)	26.4% (93)	50% (176)	17.6% (62)	3.77	0.854
7.	The instructional method can enhance my English skills.	16.5% (58)	48.6% (171)	28.1% (99)	3.10% (11)	3.70% (13)	2.29	0.907
8.	There is close interaction between teachers and students.	22.7% (80)	40.6% (143)	28.4% (100)	4.80% (17)	3.40% (12)	2.26	0.974
9.	The learning activities and tasks contribute to my learning.	17% (60)	43.5% (153)	31.5% (111)	4% (14)	4% (14)	2.34	0.942
10.	The teachers can effectively use multimedia, such as PowerPoint and videos, to assist teaching.	3.40% (12)	3.40% (12)	30.4% (107)	47.2% (166)	15.6% (55)	3.68	0.897
11.	I evaluate my learning primarily based on exam scores.	2.80% (10)	11.9% (42)	33.5% (118)	34.7% (122)	17% (60)	3.51	1.001
12.	The college English course offers abundant learning resources, including reading materials and short videos.	21.9% (77)	48.3% (170)	22.7% (80)	4% (14)	3.10% (11)	2.18	0.925

The survey results revealed students' perceptions regarding the college English course. While students acknowledge its importance, significant challenges persist in engagement, confidence-building, and instructional effectiveness. The over reliance on lecture-based teaching, limited interactive learning activities, and a lack of diverse resources are identified as critical areas needing improvement. Prior research has critiqued traditional teaching methodologies, highlighting their detrimental impact on student motivation and engagement [30], [31]. The monotonous and unengaging learning activities, not only impede students' initiative for autonomous learning but also diminish their overall motivation [30], [31]. Hence, a more student-centered, interactive, and resource-rich approach to enhance the overall effectiveness of the college English course is needed to prepare students for the demands of global communication and English proficiency.

3.4. Learning preference

Learning preferences refer to the methods, styles, or approaches that individuals find most effective and comfortable in their learning process [32]. By identifying and accommodating diverse learning preferences, educators can create more inclusive and engaging learning environments. Table 3 illustrates the mean scores and standard deviations for each learning preference scale.

Table 3. Statistics of undergraduates' learning preference

No.	Items	SD	D	N	A	SA	M	SD
1.	I learn better in class when the teacher provides clear explanations and guidance.	2.8% (10)	4.5% (16)	26.4% (93)	46.9% (165)	19.3% (68)	3.75	0.914
2.	I prefer working independently on learning tasks.	3.1% (11)	8.8% (31)	26.7% (94)	43.2% (152)	18.2% (64)	3.64	0.979
3.	Collaborating with others enhances my productivity.	4.8% (17)	10.8% (38)	27.6% (97)	40.3% (142)	16.5% (58)	3.53	1.04
4.	I prefer group learning.	3.4% (12)	7.1% (25)	28.7% (101)	42.3% (149)	18.5% (65)	3.65	0.972
5.	Engaging in group activities like role-playing in class enhances my English ability.	2.8% (10)	7.4% (26)	26.1% (92)	46.3% (163)	17.3% (61)	3.68	0.941
6.	Group learning helps me learn more effectively.	4% (14)	4.8% (17)	24.7% (87)	47.4% (167)	19% (67)	3.73	0.958
7.	Engaging in simulated scenarios helps me exercise my skills effectively.	4% (14)	4.8% (17)	23.9% (84)	50.3% (177)	17% (60)	3.72	0.939
8.	I prefer learning in a simulated environment.	4.8% (17)	6.8% (24)	33% (116)	40.1% (141)	15.3% (54)	3.54	0.992
9.	I learn more from reading textbooks than from lectures.	5.4% (19)	20.2% (71)	37.8% (133)	25.3% (89)	11.4% (40)	3.17	1.04
10.	Completing learning projects enhances my learning.	3.4% (12)	6.8% (24)	20.7% (73)	49.1% (173)	19.9% (70)	3.75	0.963

The students' preferences for instructional approaches revealed a strong inclination towards both teacher guidance and autonomous learning. A majority of students (66.2%) expressed a preference for teacher-provided explanations and guidance ($M=3.75$, $SD=0.914$), while a significant portion (61.4%) also showed a preference for working independently on learning tasks ($M=3.64$, $SD=0.979$). These results suggest the importance of adopting a balanced pedagogical approach that integrates both structured guidance and opportunities for independent learning.

Students' attitudes toward collaborative and group learning demonstrated a consistent preference for these modalities. A significant proportion of students (56.8%) reported that collaborating with others enhances their productivity ($M=3.53$, $SD=1.04$). Likewise, 60.8% expressed a preference for group learning ($M=3.65$, $SD=0.972$) and 63.6% believed that participating in group activities, such as role-playing, improves their English skills ($M=3.68$, $SD=0.941$). 66.4% indicated that group learning facilitates more effective learning ($M=3.73$, $SD=0.958$). These findings suggest that the majority of students support collaborative and group learning, highlighting the need to incorporate these approaches into course design to enhance student engagement and learning outcomes.

The analysis of students' preferences for simulated learning environments revealed a generally positive attitude. A substantial proportion of students (67.3%) indicated that engaging in simulated scenarios helps them effectively develop their skills ($M=3.72$, $SD=0.939$). Similarly, 55.4% of students expressed a preference for learning in a simulated environment ($M=3.54$, $SD=0.992$). These results suggest that the inclusion of simulations has the potential to enhance students' skill development and engagement.

The analysis of students' responses to project-based learning revealed a strong preference for this instructional method. Specifically, 69% of students agreed or strongly agreed that completing learning projects enhances their overall learning experience ($M=3.75$, $SD=0.963$). This finding suggests that the integration of project-based learning into the curriculum could play a critical role in improving student engagement and promoting more effective learning outcomes.

The learning preference survey identified teacher guidance and project-based learning as the most favored approaches, emphasizing the importance of structured support and practical experiences. Students also showed a clear preference for group learning and cooperative activities, such as role-playing, highlighting the value they place on interactive, collaborative environments. Positive feedback on simulated learning scenarios reflects a desire for immersive, context-rich experiences. Meanwhile, the preference for independent learning underscores the need to balance collaborative and autonomous learning. These findings align with previous research, supporting the diversification of instructional methods in college English courses [28], [32], [33]. Additionally, the results suggest that integrating interactive and context-driven strategies, such as simulations and project-based tasks, may enhance both engagement and learning

outcomes. By addressing diverse learning preferences, instructors can create a more inclusive and effective environment, further aligning instructional practices with the evolving needs of Generation Z learners.

3.5. Readiness for using metaverse-based blended learning in college English course

The success of MBBL in college English courses relies on technological readiness, students' acceptance and willingness, and the availability of relevant educational resources. The readiness of undergraduate students for the metaverse-enhanced learning in college English courses was examined and presented in Table 4 using descriptive statistics such as mean scores, standard deviations, and frequency distributions. Students' attitudes and preparedness for the incorporation of metaverse technology in their English language learning was investigated.

Table 4. Undergraduates' readiness for MBBL in college English course

No.	Items	SD	D	N	A	SA	M	SD
1.	I possess basic computer handling skills, such as program installation.	3.10% (11)	3.40% (12)	25.3% (89)	49.4% (174)	18.8% (66)	3.77	0.899
2.	I frequently use a computer or tablet for work or leisure activities.	3.70% (13)	4.80% (17)	25.3% (89)	46% (162)	20.2% (71)	3.74	0.957
3.	I am familiar with the metaverse technology.	7.40% (26)	19.9% (70)	38.1% (134)	25.3% (89)	9.40% (33)	3.09	1.057
4.	I have experience using metaverse or a similar virtual learning environment, such as virtual reality or augmented reality.	14.2% (50)	20.5% (72)	30.1% (106)	23.6% (83)	11.6% (41)	2.98	1.216
5.	I have experience in a blended learning mode.	3.10% (11)	2.80% (10)	27% (95)	50.3% (177)	16.8% (59)	3.75	0.878
6.	I can effectively communicate with teachers and classmates using the online learning platform.	3.40% (12)	5.70% (20)	25% (88)	48.9% (172)	17% (60)	3.7	0.933
7.	I am comfortable collaborating with classmates in different locations online.	2.60% (9)	6.50% (23)	26.4% (93)	46.6% (164)	17.9% (63)	3.71	0.923
8.	I am comfortable with asking questions and make comments using online learning platform.	2.30% (8)	4.30% (15)	25% (88)	50.3% (177)	18.2% (64)	3.78	0.872
9.	I am willing to actively engage in a metaverse-based blended learning module for English learning.	3.40% (12)	4.50% (16)	27% (95)	46% (162)	19% (67)	3.73	0.936
10.	Metaverse-based blended learning provides opportunities to practice my English skills.	2.80% (10)	3.40% (12)	25.9% (91)	46.9% (165)	21% (74)	3.8	0.907
11.	I think the Metaverse-based blended learning is more effective than traditional face-to-face classroom learning.	3.70% (13)	4.50% (16)	29.5% (104)	46.3% (163)	15.9% (56)	3.66	0.926
12.	I always have Internet access available.	Yes (100%)		No (0%)				
13.	I use the following devices to access the Internet. (select all that apply)	Laptop 99.3%	Smart phone 100%	Tablet 36.5%	At least one of the above 100%		None 0%	

Students' readiness for MBBL is reflected in their technology skills and usage patterns. Nearly 95% of students possess basic computer skills, such as program installation ($M=3.77$, $SD=0.899$), and frequently use computers or tablets for both work and leisure ($M=3.74$, $SD=0.957$). This suggests that students are regularly engaging with electronic devices, consistent with the tech-savvy nature of Generation Z [18], [33].

Familiarity with metaverse technology among students appears to be limited. Only 34.7% of students reported being familiar with metaverse technology ($M=3.09$, $SD=1.057$), and 35.2% indicated experience with similar virtual environments, such as VR or AR ($M=2.98$, $SD=1.216$). As metaverse technology is still in its developmental phase, it is essential to provide adequate training to ensure students can effectively engage with and utilize this technology in educational settings.

Students' prior experiences with online and blended learning highlight their preparedness for MBBL. Nearly 70% of students have participated in blended learning ($M=3.75$, $SD=0.878$), indicating a solid foundation for adapting to MBBL. Additionally, their interactions within online learning platforms show high levels of comfort and familiarity. A majority of students reported effectively communicating with teachers and peers online ($M=3.70$, $SD=0.933$), collaborating with classmates ($M=3.71$), and feeling comfortable asking questions and making comments online ($M=3.78$, $SD=0.923$). These findings demonstrate that students are well-equipped for the increased integration of online and blended learning approaches.

Students also demonstrate a strong willingness to embrace MBBL. Over 65% expressed a readiness to actively engage in MBBL and related training ($M=3.73$, $SD=0.936$), reflecting a positive attitude towards adopting innovative learning methods. Moreover, students recognize the potential advantages of MBBL. More than 62% believe it offers valuable opportunities to practice English skills ($M=3.8$, $SD=0.907$) and

view MBBL as more effective than traditional face-to-face learning ($M=3.66$, $SD=0.926$). These findings suggest that students not only welcome MBBL but also perceive it as a method that can significantly enhance their language learning experience.

Students' access to internet connectivity and device ownership strongly indicates their readiness for MBBL. The fact that all students reported having internet access, and each owns at least one internet-capable device, underscores their hardware readiness for the successful implementation of MBBL. This widespread access to technology further supports the feasibility of integrating MBBL into their learning environment.

Collectively, these findings indicate that students are not only technologically prepared but also demonstrate a strong willingness to engage in MBBL. This aligns with recent research suggesting that blended learning has become increasingly prevalent and effective in higher education [9]–[11]. The readiness and positive attitude of students towards this approach underscore its potential as a transformative method for enhancing English language acquisition. Participants not only recognize the practical benefits of such a framework in improving their language skills but also anticipate a more engaging and immersive learning experience compared to traditional methods.

Furthermore, these results corroborate previous studies [34]–[36] that have highlighted the efficacy of innovative technological approaches in language learning contexts, particularly in fostering motivation and participation. The combination of technological readiness, positive reception, and recognition of benefits suggests that MBBL could serve as a pivotal tool for addressing persistent challenges in language education, such as low engagement and limited interaction. These insights provide actionable guidance for educators seeking to implement advanced technologies to create more effective and learner-centered English courses.

4. CONCLUSION

This study comprehensively examined undergraduates' perspectives on current English courses, their learning preferences, and readiness to adopt a MBBL module. Findings revealed a moderate level of EFL competence among students, a strong preference for collaborative and simulated learning environments, and high technological readiness. These results highlight the need for more engaging, student-centered, and resource-rich instructional approaches to better equip students for global communication and improved English proficiency.

The insights provide actionable guidance for designing and implementing the MBBL module. By aligning metaverse technology with students' readiness and preferences, educators and institutions can foster more effective, immersive, and engaging English learning environments. These findings emphasize the importance of incorporating interactive methods, such as project-based learning and simulated scenarios, to enhance learning outcomes and satisfaction among college students.

However, this study has certain limitations. The sample data were collected primarily from the southwestern region of China, potentially limiting generalizability to other cultural and geographical contexts. Future research should address these limitations and explore the long-term impacts of MBBL in diverse educational settings.

FUNDING INFORMATION

This work was supported by the University of Malaya through the Dana University of Malaya (University Grant) [Project No. UMG009O-2021] and by the Humanities and Social Science Research Program of the Chongqing Municipal Education Commission [Grant No. 22SKGH348].

AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Yuliang Jiao	✓	✓	✓	✓	✓	✓		✓	✓				✓	✓
Rafiza Abdul Razak	✓			✓				✓	✓	✓		✓		
Dorothy DeWitt	✓	✓	✓				✓			✓		✓	✓	✓

C : Conceptualization

M : Methodology

So : Software

Va : Validation

Fo : Formal analysis

I : Investigation

R : Resources

D : Data Curation

O : Writing - Original Draft

E : Writing - Review & Editing

Vi : Visualization

Su : Supervision

P : Project administration

Fu : Funding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

ETHICAL APPROVAL

The research related to human use has complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the University of Malaya Research Ethics Committee (Approval No. UM.TNC2/UMREC_2883).

DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author, [RAR], upon reasonable request. The data are not publicly available due to privacy restrictions.

REFERENCES

- [1] Q. Guo, B. Yang, L. Xiao, and C. Xie, "Foreign language learning and the development of global competence in different cultures," *International Journal of Intercultural Relations*, vol. 101, p. 102013, Jan. 2024, doi: 10.1016/j.ijintrel.2024.102013.
- [2] EF Education First, *EF English Proficiency Index 2023-China Fact Sheet (Ranked no. 82 of 113; EPI score: 464; Asia 14/23)*. EF Education First, 2023.
- [3] L. Chen and W. Li, "Language acquisition and regional innovation: evidence from English proficiency in China," *Managerial and Decision Economics*, vol. 43, no. 1, pp. 178–191, Jan. 2022, doi: 10.1002/mde.3374.
- [4] D. Shu, "College English teaching and the cultivation of international talents," *Journal of Foreign Languages*, vol. 43, no. 5, pp. 8–20, 2020.
- [5] Z. Pan, Y. Wang, and A. Derakhshan, "Unpacking Chinese EFL students' academic engagement and psychological well-being: the roles of language teachers' affective scaffolding," *Journal of Psycholinguistic Research*, vol. 52, no. 5, pp. 1799–1819, Oct. 2023, doi: 10.1007/s10936-023-09974-z.
- [6] M. Li and Z. Yu, "A systematic review on the metaverse-based blended English learning," *Frontiers in Psychology*, vol. 13, Jan. 2023, doi: 10.3389/fpsyg.2022.1087508.
- [7] B. Anthony *et al.*, "Blended learning adoption and implementation in higher education: a theoretical and systematic review," *Technology, Knowledge and Learning*, vol. 27, no. 2, pp. 531–578, Jun. 2022, doi: 10.1007/s10758-020-09477-z.
- [8] C. Dziuban, C. R. Graham, P. D. Moskal, A. Norberg, and N. Sicilia, "Blended learning: the new normal and emerging technologies," *International Journal of Educational Technology in Higher Education*, vol. 15, no. 1, pp. 1–16, Dec. 2018, doi: 10.1186/s41239-017-0087-5.
- [9] R. Castro, "Blended learning in higher education: trends and capabilities," *Education and Information Technologies*, vol. 24, no. 4, pp. 2523–2546, Jul. 2019, doi: 10.1007/s10639-019-09886-3.
- [10] A. Bozkurt, "A retro perspective on blended/hybrid learning: systematic review, mapping and visualization of the scholarly landscape," *Journal of Interactive Media in Education*, no. 1, pp. 1–15, Jul. 2022, doi: 10.5334/jime.751.
- [11] L. Johnson, "The NMC horizon report: 2012 higher education edition. Austin, TX: the new media consortium.,," *The New Media Consortium*, pp. 1–44, 2012.
- [12] T. Ghazizadeh and H. Fatemipour, "The effect of blended learning on efl learners' reading proficiency," *Journal of Language Teaching and Research*, vol. 8, no. 3, pp. 606–614, May 2017, doi: 10.17507/jltr.0803.21.
- [13] J. Sahni, "Does blended learning enhance student engagement? evidence from higher education," *Journal of e-Learning and Higher Education*, pp. 1–14, 2019, doi: 10.5171/2019.121518.
- [14] N. R. Alsalthi, M. E. Eltahir, and S. S. Al-Qatawneh, "The effect of blended learning on the achievement of ninth grade students in science and their attitudes towards its use," *Heliyon*, vol. 5, no. 9, 2019, doi: 10.1016/j.heliyon.2019.e02424.
- [15] N. van der Stap, T. van den Bogaart, E. Rahimi, and J. Versendaal, "Fostering online interaction in blended learning through social presence and convergence: a systematic literature review," *Journal of Computer Assisted Learning*, vol. 40, no. 4, pp. 1712–1726, Apr. 2024, doi: 10.1111/jcal.12981.
- [16] Y. Cao, J. J. Jeyaraj, and A. B. Razali, "Challenges in promoting learner autonomy in blended learning: perspectives from English as a foreign language teachers in China," *International Journal of English Language Education*, vol. 12, no. 2, pp. 122–139, Sep. 2024, doi: 10.5296/ijelev.v12i2.22272.
- [17] A. Tlili *et al.*, "Is Metaverse in education a blessing or a curse: a combined content and bibliometric analysis," *Smart Learning Environments*, vol. 9, no. 1, pp. 1–31, Dec. 2022, doi: 10.1186/s40561-022-00205-x.
- [18] G. Liu, X. Wang, N. Gao, and H. Hu, "From virtual reality to metaverse: a new direction of online education," *Modern Distance Education Research*, vol. 33, no. 6, pp. 12–22, 2021.
- [19] A. Ueno, L. Curtis, R. Wood, M. Al-Emran, and C. Yu, "A review of the metaverse in higher education: opportunities, challenges and future research agenda," in *Studies in Computational Intelligence*, vol. 1161, 2024, pp. 1–17, doi: 10.1007/978-3-031-61463-7_1.
- [20] Q. Wang, L. Tang, and Y. Wang, "Potential applications of the metaverse in higher English education," *Open Journal of Social Sciences*, vol. 11, no. 01, pp. 450–459, 2023, doi: 10.4236/jss.2023.111031.
- [21] P. Henderson, R. Islam, P. Bachman, J. Pineau, D. Precup, and D. Meger, "Deep reinforcement learning that matters," *32nd AAAI Conference on Artificial Intelligence, AAAI 2018*, vol. 32, pp. 1–9, 2018, doi: 10.1609/aaai.v32i1.11694.
- [22] B. Kye, N. Han, E. Kim, Y. Park, and S. Jo, "Educational applications of metaverse: possibilities and limitations," *Journal of Educational Evaluation for Health Professions*, vol. 18, no. 32, Dec. 2021, doi: 10.3352/jeehp.2021.18.32.

- [23] V. Puncreobutr, A. Dhamacharoen, and W. Tapaneeyakorn, "Factors affecting the readiness of Thai universities to organize learning activities in the metaverse era," *Webology*, vol. 19, no. 2, pp. 9285–9296, 2022.
- [24] G. Makransky and R. E. Mayer, "Benefits of taking a virtual field trip in immersive virtual reality: evidence for the immersion principle in multimedia learning," *Educational Psychology Review*, vol. 34, no. 3, pp. 1771–1798, Sep. 2022, doi: 10.1007/s10648-022-09675-4.
- [25] Y. Jiao, D. Dewitt, and R. B. A. Razak, "Exploring the potential of metaverse-based platforms for enhancing English as a foreign language (EFL) learning: a comprehensive systematic review," *International Journal of Information and Education Technology*, vol. 14, no. 2, pp. 231–239, 2024, doi: 10.18178/ijiet.2024.14.2.2044.
- [26] D. O. Green, J. W. Creswell, R. J. Shope, and V. L. P. Clark, "Grounded theory and racial/ethnic diversity," *The SAGE Handbook of Grounded Theory*, pp. 472–492, 2007, doi: 10.4135/9781848607941.n22.
- [27] D. Cohen and B. Crabtree, *Qualitative research guidelines project*. Princeton, NJ: Robert Wood Johnson Foundation, 2006.
- [28] J. M. Reid, *Perceptual learning style preference questionnaire*. Murdoch Teacher Center, Wichita, Kansas, 1984.
- [29] V. A. P. Ramamurthy, "Development of Technical Communication Pedagogical Module for Industry-Based Curriculum in Institusi Kemahiran Malaysia," Ph.D. dissertation, Faculty of Education, University of Malaya, Kuala Lumpur, Malaysia, 2020.
- [30] B. He, "Reflection on the college English Teaching reform from the perspective of combination of courses with ideological and political education," in *Proceedings of the International Conference on Mental Health and Humanities Education (ICMHHE 2020)*, 2020, pp. 161–164, doi: 10.2991/assehr.k.200425.035.
- [31] X.-L. Wang, "A critique on new horizon college english-viewing, listening & speaking," in *3rd International Conference on Education and Social Development (ICESD 2017)*, 2017, doi: 10.12783/dtssehs/icesd2017/11531.
- [32] N. D. Fleming, "I'm different; not dumb. Modes of presentation (VARK) in the tertiary classroom," in *Proceedings of the 1995 Annual Conference of the Higher Education and Research Development Society of Australasia (HERDSA)*, 1995, pp. 308–313.
- [33] L. Jacka and M. Hill, "Anticipating engagement: pre-service teachers' perceptions of virtual worlds," in *Authentic Virtual World Education: Facilitating Cultural Engagement and Creativity*, Singapore: Springer Singapore, 2017, pp. 135–151, doi: 10.1007/978-981-10-6382-4_9.
- [34] S. M. Park and Y. G. Kim, "A metaverse: taxonomy, components, applications, and open challenges," *IEEE Access*, vol. 10, pp. 4209–4251, 2022, doi: 10.1109/ACCESS.2021.3140175.
- [35] K. Hirsh-Pasek *et al.*, "A whole new world: education meets the metaverse," *Center for Universal Education*, no. February, pp. 1–13, 2022.
- [36] M. Damar, "Metaverse shape of your life for future: a bibliometric snapshot," *Journal of Metaverse*, vol. 1, no. 1, pp. 1–8, 2021.

BIOGRAPHIES OF AUTHORS



Yuliang Jiao    is a PhD student of University of Malaya. He received his master degree in Curriculum and Instructional from China West Normal University and his bachelor degree from Shandong First Medical University, Shandong, China. In 2012 he joined the Faculty of Foreign Languages of Chongqing Three Gorges University, Chongqing, China, as a lecturer. He has written several papers in the areas of curriculum and instruction, teaching English as a foreign language, educational technology. His research interests also include metaverse, AI, and their application in education. He can be contacted at email: jiaoyuliang@gmail.com.



Rafiza Abdul Razak    is an associate professor of Curriculum and Instructional Technology at the Faculty of Education, University of Malaya. She earned her PhD in Instructional Technology from the International Islamic University Malaysia (IIUM), her master of education in educational technology from University of Malaya. Her research focuses on instructional technology, e-learning, and innovative education, with numerous publications in high-impact journals. Additionally, she has extensively explored language policy, ESL literacy practices, multimodal literacies, literacy assessment, and environmental education for sustainable development (EESD). She can be contacted at email: rafiza@um.edu.my.



Dorothy DeWitt    is a research fellow and retired associate professor in the Curriculum and Instructional Technology Department at the University of Malaya. She holds a PhD in instructional technology and an MEd in mathematics education from the University of Malaya. Her research focuses on instructional design, collaborative mobile learning, and problem-solving. Recognized for her teaching innovations, she is also an alumna of the Endeavour Executive Fellowship from the Australian government and formerly worked with the Educational Technology Division (ETD) of the Ministry of Education, Malaysia. She can be contacted at email: dorothy@um.edu.my.